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Managing Water in the West

Central Valley Project Cost Allocation Study -- Irrigation and Municipal & Industrial (M&I) Benefits

Public Meeting

August 9, 2013

U.S. Department of the Interior
Bureau of Reclamation

CVP-CAS (Central Valley Project Cost Allocation Study)

- **Meeting Purpose**
  - **Project Status**
  - **Water Supply Benefit Analysis Approach (Irrigation and M&I)**
  - **Next Steps**

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CVP-CAS (Central Valley Project Cost Allocation Study)

- **Background**
  - **Cost Allocation Study Purpose and Process**
    - http://www.usbr.gov/mp/cvp/cvp-cas/index.html
  - **Summary of 5/17/12 Meeting**
    - **Water Supply Modeling Analysis Approach**

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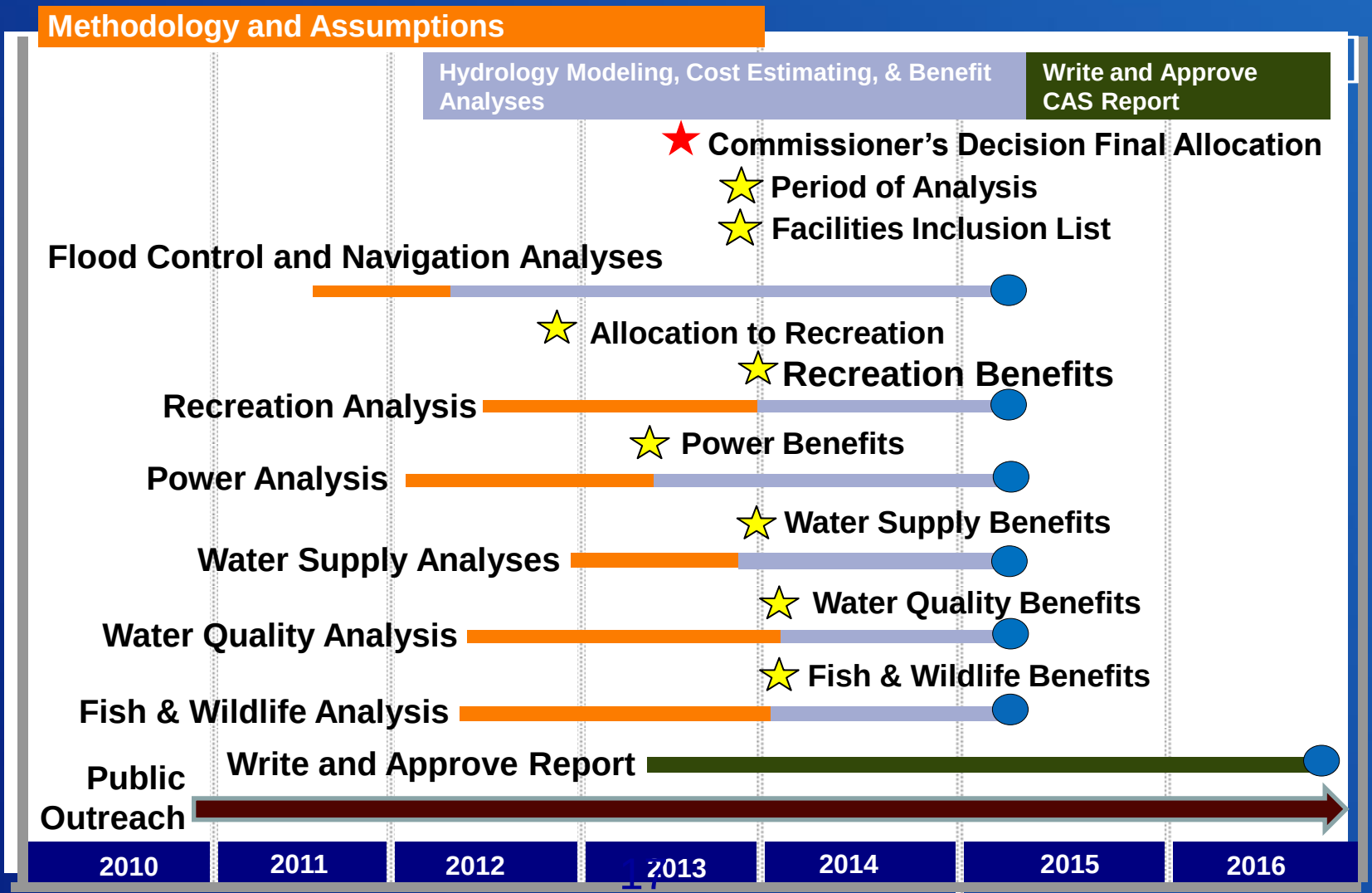
CVP-CAS Schedule



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CVP-CAS Schedule Legend

	Methodology and Assumptions
	Hydrology, Cost Estimating, Benefit Analysis
	Write and Approve CAS Report
	Public Outreach
	Reclamation Final Decision
	Leadership Team Concurrence Decision
	Deliverable

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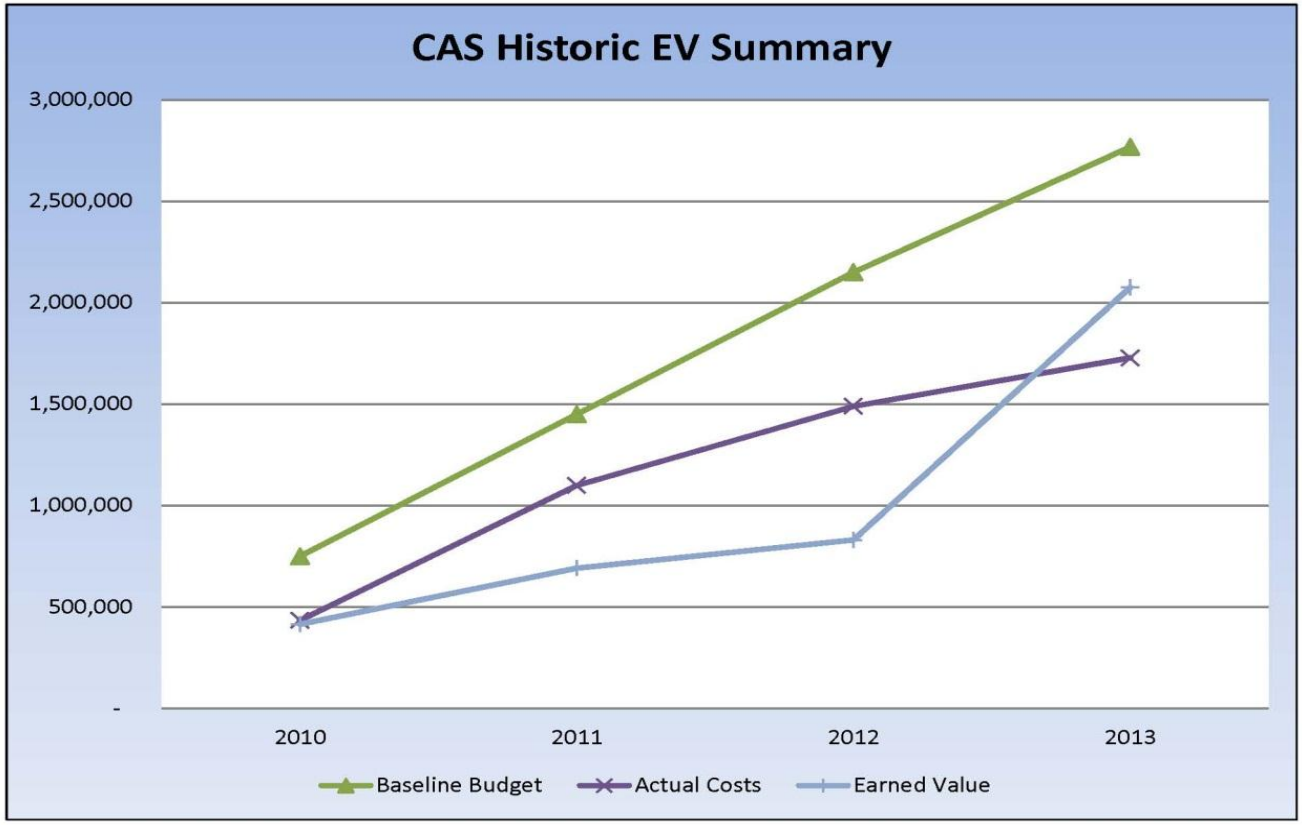
CVP-CAS Historic EV Summary



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Water Supply Benefit Analysis Approach

- **Three Water Supply Benefit Project Purposes:**
  - **Irrigation**
  - **Municipal & Industrial (M&I)**

For each water supply project purpose, the general annual economic benefit estimation approach involves multiplying:

- **Value per acre foot (AF) ***
- **Annual Water Deliveries (AF)**

CalSim Input and Economic Analysis

- CalSim Hydrology Modeling
  - BOR Hydrologist working with Central Valley Operations Office
  - Includes Biological Opinions
- Economic Analysis
  - Irrigation Deliveries
  - M&I Deliveries

Benefits (Future and Historic) and Justifiable Expenditure

- **Justifiable Expenditure:**
  - **One step of the Separable Cost-Remaining Benefits (SCRB) cost allocation methodology.**
  - **Represents the maximum amount to be allocated to each project purpose.**
  - **Calculated as the lesser of the multi-purpose project benefits or single-purpose project costs for each project purpose.**

Future Benefits and Justifiable Expenditure

- **If future benefits are greater than single-purpose costs, then the justifiable expenditure is equal to the single-purpose costs. Additional benefit analysis is not necessary.**

	Water Supply	
Allocation	Irrigation	M&I
Future Benefits	$80	$50
Historic Benefits	---	---
Estimated SPA Costs	$60	$40
Justifiable Expenditure	$60	$40

Future and Historic Benefits and Justifiable Expenditure

- **If future benefits are less than single-purpose costs, historic benefits are estimated & added to future benefits before comparing to single-purpose costs to determine justifiable expenditure.**

	Water Supply	
Allocation	Irrigation	M&I
Future Benefits	$40	$30
Historic Benefits	$10	$20
Total Benefits	$50	$50
Estimated SPA Costs	$60	$40
Justifiable Expenditure	$50	$40

Irrigation Benefits Methodology

- **Two Options for Estimating Future Irrigation Benefits:**
  - **Use SWAP Model to estimate future cropping patterns and irrigation benefit values.**
  - **Use SWAP Model to estimate future cropping patterns and Farm Budget Tool to estimate irrigation benefit values.**

Irrigation Benefit Methodology

Objective: Identify changes in net farm income generated by the CVP from a national perspective

- **Two approaches:**
  - **State Water Agricultural Production Model (SWAP)**
  - **Reclamation Farm Budget Tool**

Estimating Irrigation Benefits

- **Analytical Process:**
  - **Identify the change in crop acreage "with" and "without" the CVP.**
  - **Use SWAP Model or Farm Budget Tool to measure the changes in per-acre net farm income by crop related to the change in crop acreage.**
  - **Transform the $/acre benefit value into $/AF**

SWAP Model

- **SWAP is a widely accepted basin-level agricultural impact model for the Central Valley of California.**
- **Purpose: to dynamically estimate the change in irrigated acreage for the Central Valley given a change in CVP water deliveries.**
- **Output: changes in irrigated acreage and net agricultural income.**

Reclamation Farm Budget Tool

- Reclamation's Farm Budget Tool is a spreadsheet application that allows the user to develop and analyze farm-level crop enterprise budgets in accordance with Reclamation Policy.
- Purpose: to measure the change in net farm income by crop given a change in acreage.
- Output: net farm income for each crop included in the analysis.

Irrigation Benefit Estimation Considerations

- SWAP Interface with CALSIM
- SWAP is well-accepted model
- SWAP provides faster turnaround on analyses
- SWAP used for future benefits only
- Farm Budget Tool can be used for historic and future benefits
  - However, future cropping patterns must be projected.

M&I Benefit Methodology

Objective: Identify value of M&I water supply:

- **Two Approaches:**
  - **Demand model to estimate the value of water for M&I purposes**
  - **Cost based approaches (i.e., cost minimization and forgone use)**

M&I Benefit Methodology

The Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (P&G's) indicate the general measurement standard of value is willingness to pay (WTP).

M&I Benefit Methodology

- The P&G's also indicate that other approaches can be used to estimate benefits when market based measures of WTP are not possible.
- One alternative method includes cost based approaches.

M&I Benefit Methodology

- M&I benefits as measured by consumers WTP can be estimated through the use of previously developed M&I demand models.
- M&I benefits using a cost based/forgone use approach can be estimated using models such as the Least Cost Planning Simulation Model (LCPSIM) and others.

Demand Model Based Approach

- Statistical models have previously been developed by BOR using data from 11 water agencies in California and Nevada.
- Additional models will be run to include only California data.
- An economic value per acre foot will be obtained from these models, representing an average benefit.

Cost Based - Forgone Use Approach

- If the demand model approach is not used, a least cost modeling approach (e.g. LCPSIM) would be used.
- This approach is based on management strategies that minimize costs given regional demand and supplies.
  - Shortage losses are measured in terms of forgone use or opportunity cost.

M&I Benefit Estimation Considerations

- The demand model approach provides estimates of WTP.
- The demand model approach based on M&I use provides a relatively high estimate of benefits compared to a more conservative value estimated using a cost of service or forgone use approach.

M&I Benefit Estimation Considerations

Previous California surface storage planning studies have primarily used the cost based – forgone use (LCPSIM) approach.

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CVP-CAS Next Steps

- Public Document to Address Comments and Responses
- Continued Refinement of Process and Schedule
- Upcoming Public Meeting
  - November 15, 2013

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- http://www.usbr.gov/mp/cvp/cvp-cas/index.html
- Brooke Miller-Levy, Project Manager

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